

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

A Windscreen Wiper Assembly

We, SWF-SPEZIALFABRIK FUER AUTOZUBEHOER GUSTAV RAU G.m.b.H., of 17, Ludwigsbürgerstrasse, 7120 Bietigheim, Württemberg, Germany, a German body corporate do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention concerns a windscreen wiper installation for vehicles, especially automotive vehicles, having three separately mounted swinging windscreen wipers, the first and second of which operate in synchronism and the third in the opposite direction; they are all driven by a motor via a guide rod drive.

In some countries regulations exist regarding the minimum size of wiping areas with regard to their height and width. In wide windscreens it is difficult to keep strictly within the wiping area sizes demanded by the rules.

In order to obtain a larger wiping area than that afforded by a wiper installation with two windscreen wipers, wiper installations with three windscreen wipers have been proposed. In most of these installations, however, the size of wiping area required by the rules is not obtained, and complex and costly mechanisms are used for driving the wipers.

A wiper installation is known, for example, which is provided with a pneumatic drive.

Furthermore a wiper installation of this kind is known which is provided with a hydraulic drive. Such installations require a plurality of pressure pipes and pressure cylinders which introduce a considerable factor of unreliability with regard to operational behaviour of the wiper installation. The sealing problems alone render the installations costly.

Moreover pneumatic or hydraulic drives require considerable space behind the dashboard, which in modern automotive vehicles

is no longer available. Known devices for windscreen wiper installations having three windscreen wipers thus have considerable drawbacks which are removed by the present invention.

It is an object of the invention to provide a windscreen wiper installation having three windscreen wipers and having a driving mechanism which is simple. The assembly may conform in manufacture and assembly to economical and operational demands, and size of wiping area is obtainable which conforms to the requirements laid down by traffic authorities.

According to the present invention, there is provided a windscreen wiper assembly, especially for automotive vehicles, having three separately mounted windscreen wipers, adapted to be so driven that the first and second wipers move in the same direction whilst the third moves in the opposite direction thereto, their drive being effected by a motor via a linkage in which a push-rod connected to the motor by means of a crank forms part of a cross-arm linkage, the first windscreen wiper being directly mounted at the pivot point of the first link member, and such first link member being additionally provided with two further pivots acting as mountings for connecting rods associated with the second and third windscreen wipers, to which they are connected by cranks.

By the term a "cross-arm linkage" is meant a linkage having four link members whereof the first is mounted, preferably at its centre point, on a fixed pivot and is pivotally connected at its ends to second and third link members which cross each other and are pivotally connected to spaced points on the fourth link member. The fourth link member can be a drive member for the other link

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members, in which case it may be connected at a remote point to a rotating crank arm.

Very desirably, the pivots for the second and third wipers are so selected that the first windscreen wiper has an angular velocity which is always greater than that of the second and third windscreen wipers, and that the third windscreen wiper in an overlap region with the first windscreen wiper has an angular velocity which is smaller than that of the second windscreen wiper in the corresponding movement range.

Preferably the windscreen wiper assembly is so constructed and arranged in relation to a windscreen that the second and third windscreen wipers in their outer positions are located substantially parallel to the sides of the windscreen, and that all windscreen wipers in their parked positions are located substantially parallel to the horizontal dimensions of the windscreen.

In a preferred embodiment of the invention the pivot of the third windscreen wiper on the cross-arm linkage is located in a horizontal line through the central pivot of the linkage when the wipers are in a parked position. The line between the central pivot and the pivot on the linkage associated with the second windscreen wiper deviates from the horizontal by an angular value of about 30° to 40°.

The invention is described by way of the embodiment illustrated in the drawings.

Showing:

Fig. 1 the windscreen wiper linkage with the windscreen wipers in the parked position,

Fig. 2 the position of the windscreen wipers with the linkage in the position of Fig. 1,

Fig. 3 the windscreen wiper linkage in the other extreme position of the windscreen wiper,

Fig. 4 the position of the windscreen wipers with the linkage position of Fig. 3.

Fig. 1 shows a windscreen wiper linkage comprising a base plate 11 which may be mounted on the bodywork of the vehicle, and which has a pivot 12 on which a coupling member 14 forming the first link member of the cross-arm linkage is rotatably mounted which has two bearing pins 15 and 16 on which the second and third links 17 and 18 are pivoted, the links being also connected by pivots 19 and 20 to a push-rod 21 forming the fourth link.

The push-rod 21 is connected to a driving motor, not shown, by means of a pivot pin 22, a crank 23 and a reduction gearing 24.

The coupling member 14 of the cross-arm linkage 13 also has two pivot pins 25 and 26 each of which is connected via a connecting rod 27 or 28, pivots 29 or 30 and crank 31 or 32 to a second or third windscreen wiper 34 or 33.

A first windscreen wiper 35 is mounted on the pivot 12.

The first windscreen wiper 35 and the second windscreen wiper 34 operate in the same direction, whilst the third windscreen wiper 33 operates in the opposite direction thereto.

The pivot 26 is located on a horizontal line through the pivot 12, and the line between pivot 25 and pivot 12 deviates from the said horizontal line by between 30° to 40°. This arrangement of the linkage ensures that on moving the coupling member 14 out of the parked position, the windscreen wiper 35 has a greater starting angular velocity than the windscreen wiper 34, and the windscreen wiper 34 in turn has a greater angular velocity than the windscreen wiper 33, so that no contact between any of the wiper blades occurs in any of their phases of movement.

The gearing is so arranged that the wiper blades in their inside reversal position shown in Fig. 2, which corresponds to the parked position, are located parallel to the horizontal dimension of the windscreen, and in the other reversal position they are substantially parallel to the windscreen sides and in close proximity thereto.

The dimensions of the links, the pivotal angles of the blades and lengths of the individual windscreen wipers are so selected that a satisfactory wiping area is obtained, if necessary complying with legal requirements.

WHAT WE CLAIM IS:—

1. A windscreen wiper assembly, especially for automotive vehicles, having three separately mounted windscreen wipers adapted to be so driven that the first and second wipers move in the same direction whilst the third moves in the opposite direction thereto, their drive being effected by a motor via a linkage, in which a push-rod connected to the motor by means of a crank forms part of a cross-arm linkage, the first windscreen wiper being directly mounted at the pivot point of the first link member and such first link member being additionally provided with two further pivots acting as mountings for connecting rods associated with the second and third windscreen wipers, to which they are connected by cranks.

2. A windscreen wiper assembly according to claim 1, in which the pivots for the second and third wipers are so selected that the first windscreen wiper has an angular velocity which is always greater than that of the second and third windscreen wipers, and that the third windscreen wiper in an overlap region with the first windscreen wiper has an angular velocity which is smaller than that of the second windscreen wiper in the corresponding movement range.

3. A windscreen wiper assembly according

to claim 1 or 2, so constructed and arranged in relation to a windscreen, that the second and third windscreen wipers in their outer reversal positions are located substantially parallel to the sides of the windscreen, and that all the wipers in their parked positions are located substantially parallel to the horizontal dimensions of the windscreen.

4. A windscreen wiper assembly according and arranged in relation to a windscreen, that to anyone of claims 1 to 3, so constructed in the parked position the pivot of the connecting rod of the third windscreen wiper on the cross-arm linkage is level with the central pivot of the cross-arm linkage and that the line joining the pivot of the connecting rod associated with the second windscreen wiper

to the central pivot deviates by an angle between 30° and 40° from the horizontal dimension of the windscreen.

5. A windscreen wiper assembly according to any one of claims 1 to 4, in which in the parked position of the windscreen wipers the line joining the pivot of the third windscreen wiper on the Tschbyscheff linkage with the central pivot deviates downwardly by a small angular amount from the horizontal.

6. A windscreen wiper assembly according to any one of the preceding claims, substantially as described with reference to the accompanying drawings.

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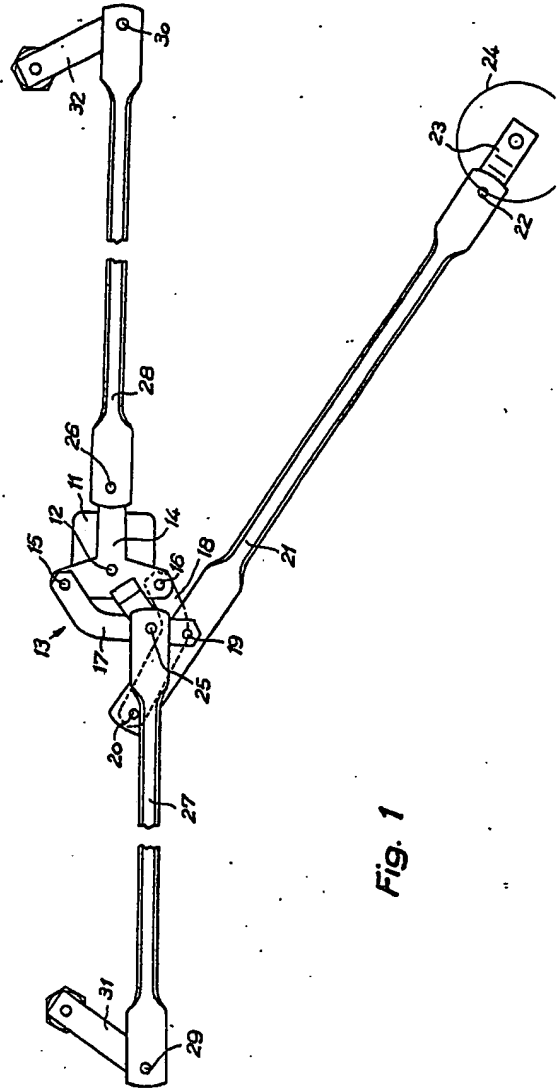
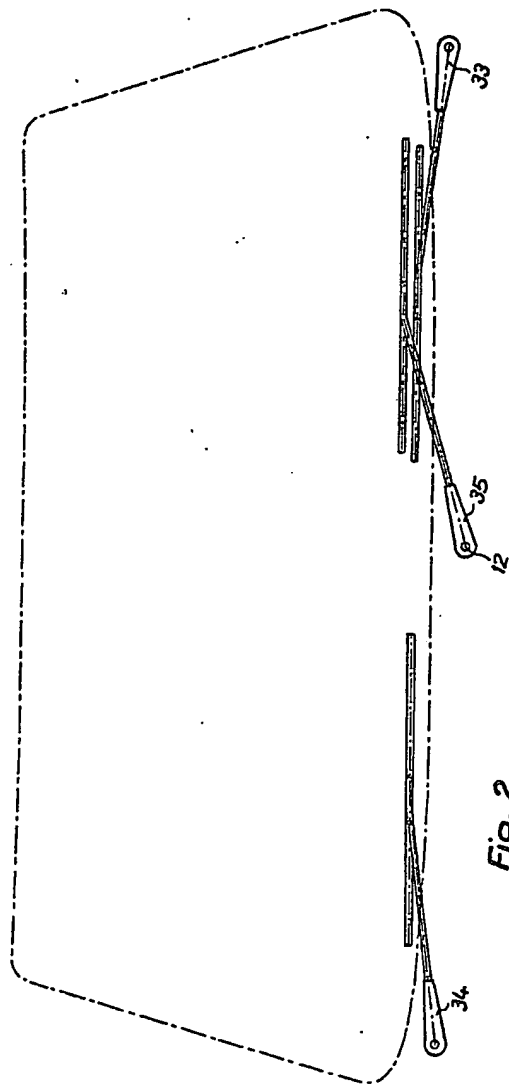
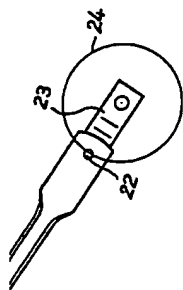


Fig. 1

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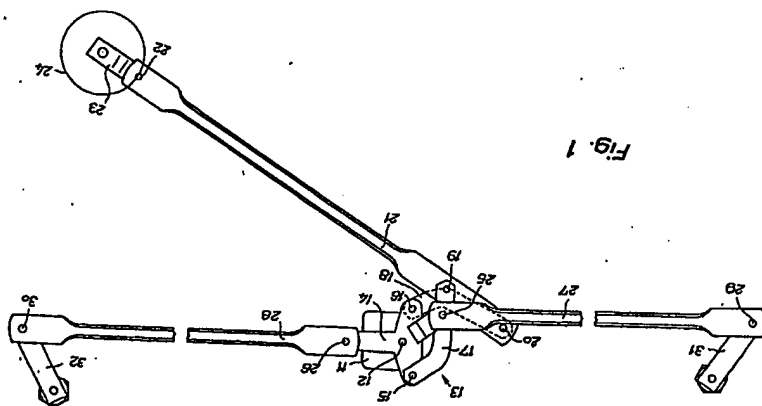


Fig. 1

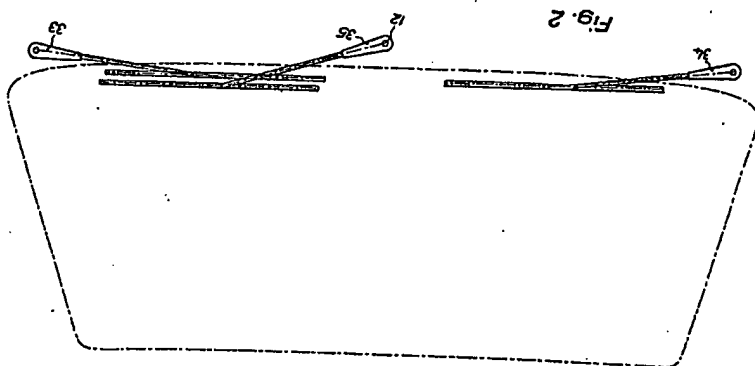


Fig. 2

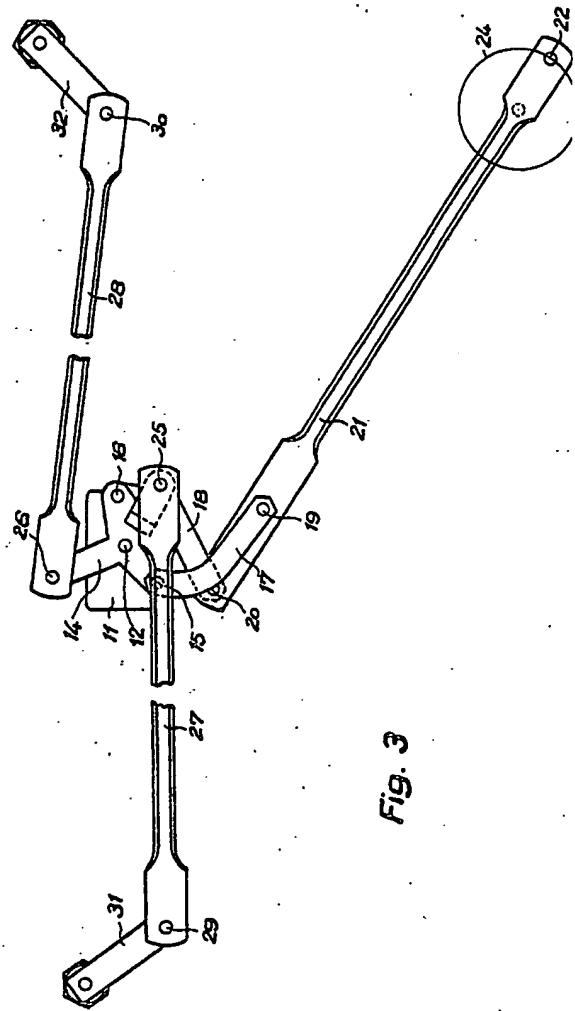


Fig. 3

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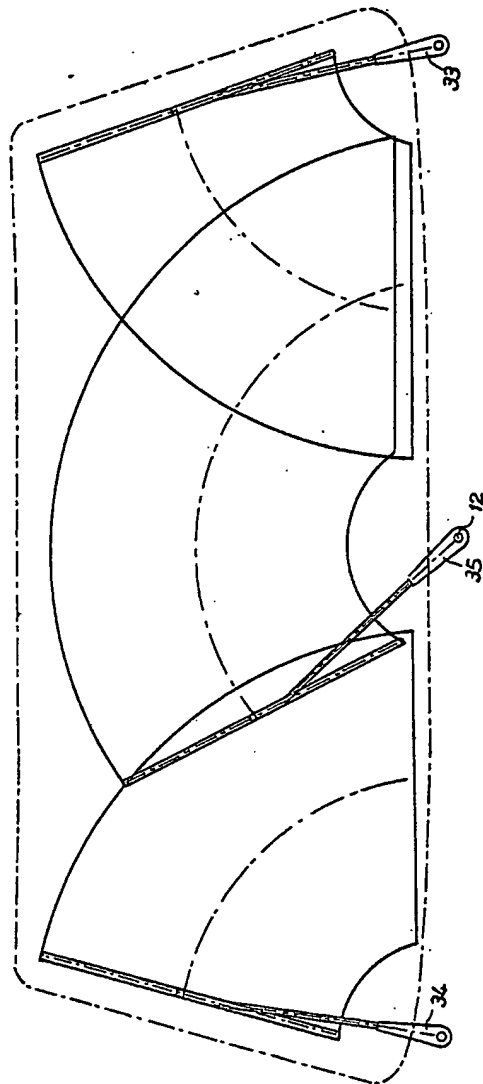
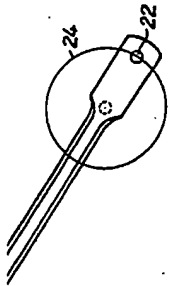
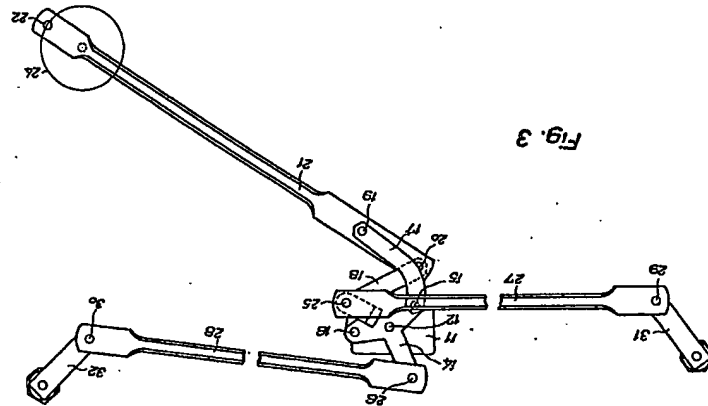
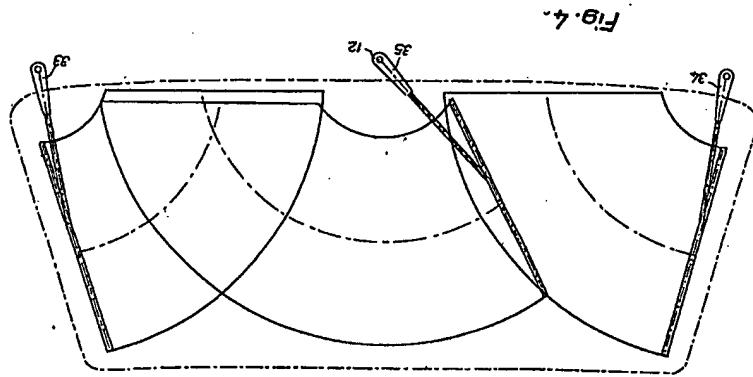


Fig. 4

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